
संयुक्ताक्षरे

Conjuncts

संयुक्ताक्षरे

Project: 3

Game Design to form
Conjuncts & Word Construction
in *Devanagari Script (Hindi)*
for Children

Guided by: Prof. *Mandar Rane*

Submitted by: *Vishnupriya Kaulgud*

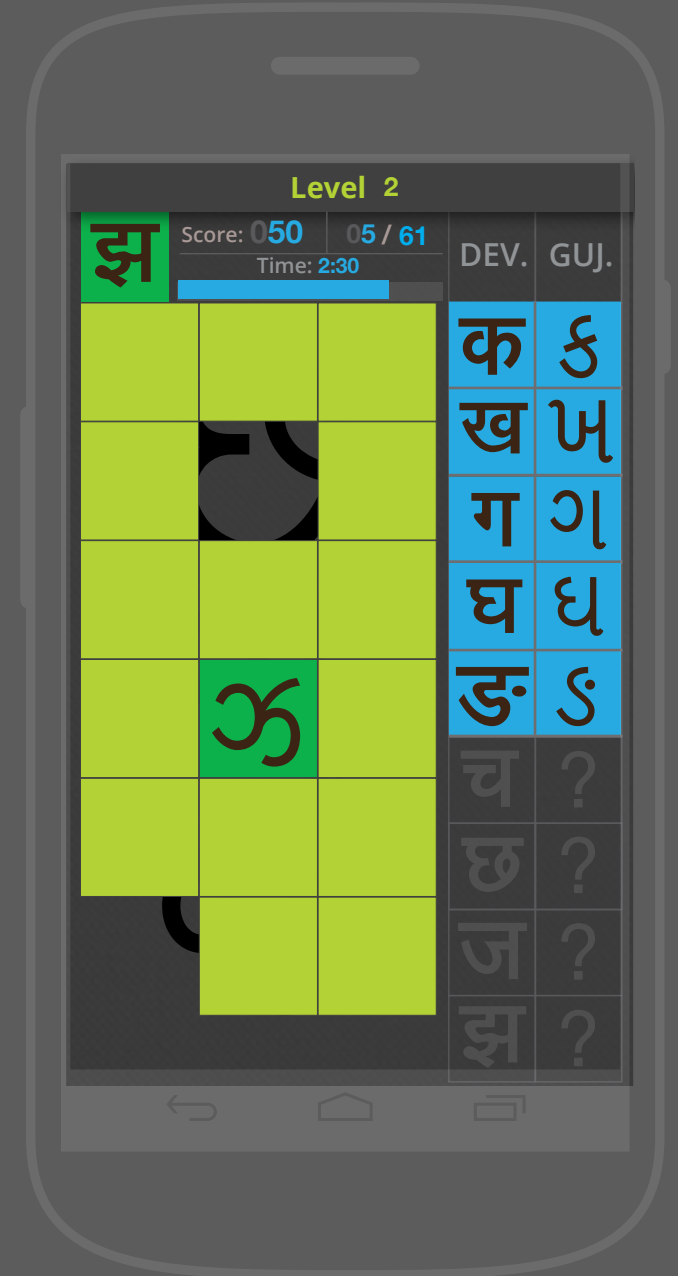
Visual Communication: 126250002

IDC, IIT Bombay 2012 - 2014



खेल-मेल फॉर रेकग्नाइजिंग गुजराती स्क्रिप्ट

Khel-Mel for Recognising
Gujarati script



এখানে ফুলিয়ার বিখ্যাত
শাড়ী পাইকারী দরে বিক্রি
সব রকম শাড়ী ও শাল তঁও প
৩৮/২৫ গড়িয়া হাট রোড, কলি

சாதிபதம்
செல்லப்பா உயர்தர



சாலை உ

ଶ୍ରୀ ଚୈତନ୍ୟ ମହାପ୍ରଭୁ
 ୧୯୮୪-୦୧-୦୧ ରେ ଗଠିତ ଚୈତନ୍ୟ
 ଶ୍ରୀମଦ୍ଦେବୀମନ୍ଦିର - ବାଲସୋର, -
 ଶ୍ରୀମଦ୍ଦେବୀମନ୍ଦିର ଓଡ଼ିଶା, ଶ୍ରୀମଦ୍ଦେବୀ
 ମନ୍ଦିର ଓଡ଼ିଶା - ୭୫୧୦୦୧ -
 ଶ୍ରୀ ଚୈତନ୍ୟ ମହାପ୍ରଭୁ - ୩
 ଶ୍ରୀ ଚୈତନ୍ୟ ମହାପ୍ରଭୁ - ୭

उत्तम
कुमार
थात
शक्तिगढ़
१२२४
लाल बहादुर शास्त्री महल
लाल बहादुर शास्त्री महल

श्री गुरुदेव उद्यान
साल - १९२७
कोष्ठे-जयवा पाशा
ता- वाद्यधुडि, भूकवि
वेर - १५०३४२
कि: नः -

ગુજરાતની અસ્મિતાનો નવો ધબકાર...

મોનિટર

૨૧મી સદીનું મેગેઝીન



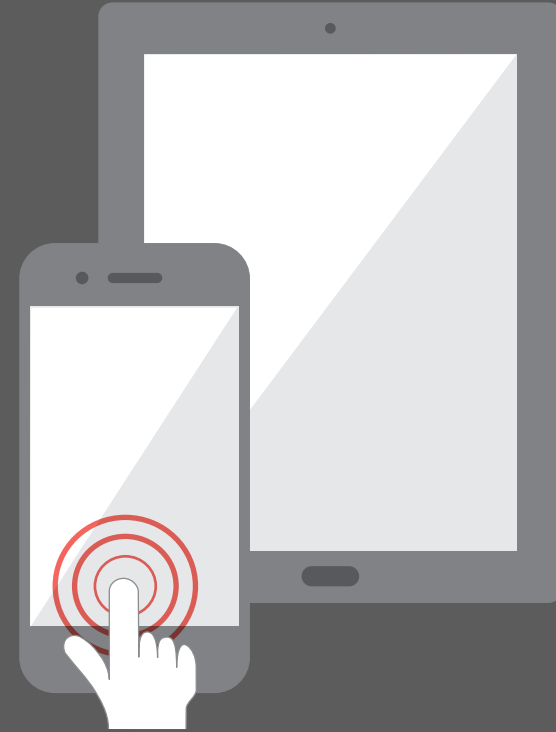
ಕರ್ನಾಟಕ ಸರ್ಕಾರ
ಬೌದ್ಧೋದ್ಧಾರ ಪ್ರದೇಶ
ತಲಕಾಡು
ಮರಳು ಸಾಗಿಸುವುದನ್ನು ನಿಷೇಧಿಸಿದೆ
ಕಾನೂನು ಉಲ್ಲಂಘಿಸಿದರೆ
ಶಿಕ್ಷೆಗೆ ಗುರಿಪಡಿಸಲಾಗುವುದು

Touch based Application:

Sound:

When a letter-form is visible, and it is supported by sound, a child could associate them both in a better way.

Interactive Memory Game to identify *Gujarati* script by taking *Devanagari* script as a supporting script.



खेल-मेल फॉर रेकग्नाइजिंग देवनागरी स्क्रिप्ट - हिंदी

Khel-Mel for Recognising
Devanagari script - Hindi

This game can be played with
any Indic script. If it has to played
to recognise *Hindi* language i.e.
Devanagari script, sound will play
important role here.



Game-play:

STEP 1:

Click any green tile.



A picture and a sound will be heard. (Here picture of letter 'ka' and sound of 'ka' will be heard)



STEP 2:

Click on another tile.



Another sound will be heard.
(Here only sound of 'ka' will
be heard)

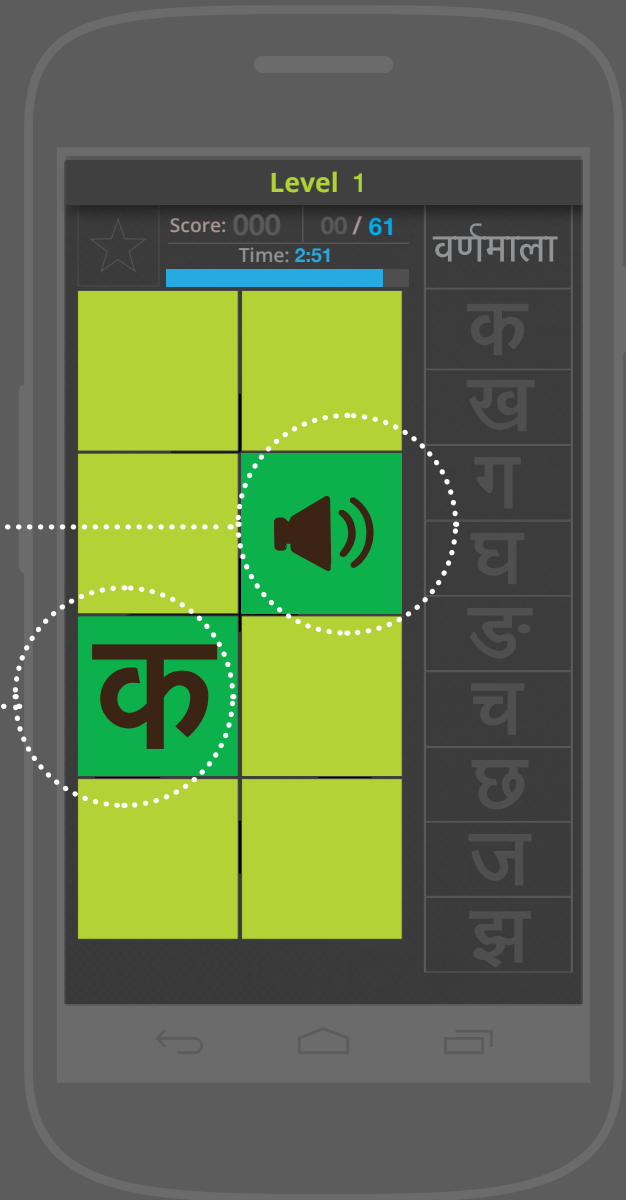


The letter-form and sound matches, the letter will indicate correct in green colour and sit in right-hand side bar.



Letter Sound

Letter Sound
Letter Picture



If the answer is wrong, it will indicate wrong in red colour and the tiles will close back again.

In the same manner, the game has to be played. As the level increases, the number of letter-forms to be solved will increase.



Tile 1

Tile 2

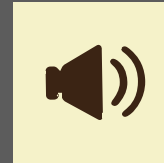
Redundancy

Letter Picture

Letter Sound



Low



Tile 1	Tile 2	Redundancy
Letter Picture	Letter Sound }	Low
Letter Picture Letter Sound	Letter Picture Letter Sound }	High
 	 	

Tile 1	Tile 2	Redundancy
Letter Picture	Letter Sound }	Low
Letter Picture Letter Sound	Letter Picture Letter Sound }	High
Letter Picture Letter Sound क 	Letter Picture क 	Middle
Letter Picture Letter Sound क 	Letter Sound 	

Tile 1	Tile 2	Redundancy
Letter Picture	Letter Sound }	Low
Letter Picture Letter Sound	Letter Picture Letter Sound }	High
Letter Picture Letter Sound	Letter Picture }	Middle
Letter Picture Letter Sound	Letter Sound	

क

🔊

🔊

Recognition

Recognition

Formation

How is Letter 'क' formed?

By joining 2 lines, 2 circles?



How many knows 'क' has
an inherent vowel 'अ'?

क् + अ = क

रिमेम्बर!

Remember!

रिमेम्बर!

REMEMBER!

- It will be a Game application to teach Conjuncts in Devanagari script - Hindi language
- This Game will teach comprehension of the script **NOT** writing

रिमेम्बर!

REMEMBER!

- It will be a Game application to teach Conjuncts in Devanagari script - Hindi language
- This Game will teach comprehension of the script **NOT** writing
- It will be alternative of homework in rote learning
- Users will be age group of **8 to 10 years old children**

फाइनल गेम

Final Game

स्क्रिप्ट लर्निंग सिक्वेन्स

Script Learning Sequence

स्क्रिप्ट लर्निंग सिक्वेन्स

Script Learning Sequence

Letters

स र ज

स्क्रिप्ट लर्निंग सिक्वेन्स

Script Learning Sequence

Letters

Words

स र ज

सूरज
निकल

स्क्रिप्ट लर्निंग सिक्वेंस

Script Learning Sequence

Letters

स र ज

Words

सूरज
निकल

Sentence

सूरज निकल आया है ।

टाइप्स ऑफ़ इंडिक सिलेबल्स

Types of Indic Syllables

1. An independent VOWEL
2. An independent CONSONANT
3. Combination of a VOWEL and CONSONANT
4. Combination of CONSONANT and CONSONANT
5. Combination of VOWEL and SPECIAL CHARACTER
6. Combination of CONSONANT and SPECIAL CHARACTER

What are .
संयुक्ताक्षरे?

What are . संयुक्ताक्षरे?

Conjuncts means
joined together

CONSONANT + CONSONANT

What are . संयुक्ताक्षरे?

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It helps to form
words in a language

What are संयुक्ताक्षरे?

Conjuncts means
joined together

CONSONANT + CONSONANT

It helps to form
words in a language

In Indic language,
any sound can be
represented by
forming conjuncts

Types of . संयुक्ताक्षरे

Types of . संयुक्ताक्षरे

24 out of the 36 consonants contain a vertical right stroke (ख, घ, ण etc.). As first or middle fragments/members of a cluster, they lose that stroke:

त् + व = त्व

ण् + ढ = ण्ड

स् + थ = स्थ

Types of संयुक्ताक्षरे

श

श appears as a different, simple ribbon-shaped fragment preceding व, न, च, ल, and र.

व-श्च ल-श्च च-श्च
न-श्च र-श्च

Types of . संयुक्ताक्षरे

Form by joining shorter
consonant to full consonant:

ग् + या = ग्यारा
च् + चा = बच्चा

Types of संयुक्ताक्षरे

Few consonants when joined take a different form:

‘अखंड’
(AKHANDA)

क् + ष् + अ = क्ष

श् + र् + अ = श्र

त् + र् + अ = त्र

ज् + ज् + अ = झ

Types of संयुक्ताक्षरे

Nasal conjuncts:

These are the conjuncts which are replaced by a dot

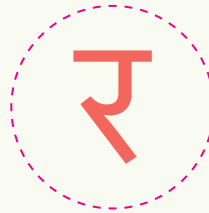
ङ - अंग

ञ - पंजाब न - हिंदी

ण - मंडल म - लंबा

Types of संयुक्ताक्षरे

'Ra' has three different conjunct form:



'रफार'
(RAFAR)

'रकार'
(RAKAR)

धर्म
ट्रेन
प्रेम



व्हाय कंजंकटस?

Why Conjuncts?

Conjuncts are taught to children by its formation or by its appearance or by using it in a word.

..... राष्ट्रपती

व्हाय कंजंकटस?

Why Conjuncts?

Conjuncts are taught to children by its formation or by its appearance or by using it in a word.

राष्ट्रपती

They are pronounced wrongly and misunderstood if not written correctly.

गुट्टी = गुट्टी

- सुनो और दोहराओ :
गुड्डा, बिट्टू, विद्या आओ ।
- चित्र के बारे में चर्चा करो ।
- पढ़ो : हल् लगाकर जुड़ें हम ।



इंटेण्डेड गोल
Intended
GOAL

इंटेण्डेड गोल
Intended
GOAL

1.

It will NOT be a
replacement for
teaching methods
in school

इंटेण्डेड गोल
Intended
GOAL

1.

It will NOT be a
replacement for
teaching methods
in school

2.

To encourage
practice in rote
learning

इंटेण्डेड गोल
Intended
GOAL

1.

It will NOT be a replacement for teaching methods in school

2.

To encourage practice in rote learning

3.

It can be a homework which will be playful and educational too

इंटेण्डेड गोल
Intended
GOAL

1.

It will NOT be a replacement for teaching methods in school

2.

To encourage practice in rote learning

3.

It can be a homework which will be playful and educational too

4.

It will concentrate on comprehension of learning conjuncts & NOT WRITING

ऑब्जेक्टिवस

Objectives

By this project, a child should know following:

- Conjunct formation
- Different types of conjuncts in *Devanagari* script (*Hindi*)
- How words are formed by conjuncts
- Use of conjuncts in words

ऑब्जेक्टिवस

Objectives

- This game would be the next level of the script recognition game *KHEL-MEL*.
Conjunct formation and word construction method in *Devanagari* script (*Hindi*).
- *Devanagari* is just a script on which the game will be mapped on.

अआइईउऊऋॠ

एऐओऔअंअः

कखगघङ

चछजझञ

टठडढण

तथदधन

पफबभम

यरलवशष

सहक्षज्ञ

टेस्ट फॉर चिल्ड्रन

Test for Children

- Task was given to children of standard 2nd to standard 6th, age group of 7 years to 11 years.
- Three levels were designed
- Total number of Children = **20**



Name: Nidhi N. Kulkarni STD.: III C

त्व = त + व

प + र् = प्र

र् + म = म्

ट + र् = ट्र

क्ष = ख + श्

क्त = क् + त्

ष्ट्र = ष + ट् + र्

क + ऋ =

अंग - ड ☒ न ☒

LEVEL: 1

Solved correctly by: **17/20**

$$\text{त्व} = \square + \square$$

LEVEL: 2

Solved correctly by: **10/20**

$$\text{प} + \text{र्} = \square$$

Conclusion:

Conjuncts formed by
letter 'Ra' created confusion.

$$\text{र्} + \text{म} = \square$$

'Akhandā' were not solved correctly.

$$\text{ट} + \text{र्} = \square$$

'Kata' form looked like only letter 'Ka'.

$$\text{क्ष} = \square + \square$$

$$\text{क्त} = \square + \square$$

LEVEL: 3

Solved correctly by: **4/20**

Conclusion:

- Three letter conjunct was new to many users.
- Users pronounced single letter and then try to solve them. By this, sound plays an important role was known.
- When conjunct takes new form (*Akhanda*) was very less known.
- By this even wrong answers were known which confuses them and later can be used for the game.

ष = + +

क + ऋ =

अंग - ड न ✓
✗

यूजर्स

Users

- In early childhood, children are more capable of learning. They try to apply their knowledge whenever they have the opportunity.
- For this project, it is necessary for a child to know the recognition of *Devanagari* script.

यूजर्स Users

- In early childhood, children are more capable of learning. They try to apply their knowledge whenever they have the opportunity.
- For this project, it is necessary for a child to know the recognition of *Devanagari* script.
- The age will be 8 to 10 years age old children who knows *Devanagari* script and have some prior knowledge of conjuncts.
- By this age even in schools, a child is taught conjuncts and word formation.



एक्सिस्टिंग टीचिंग मेथड्स

Existing Teaching Methods

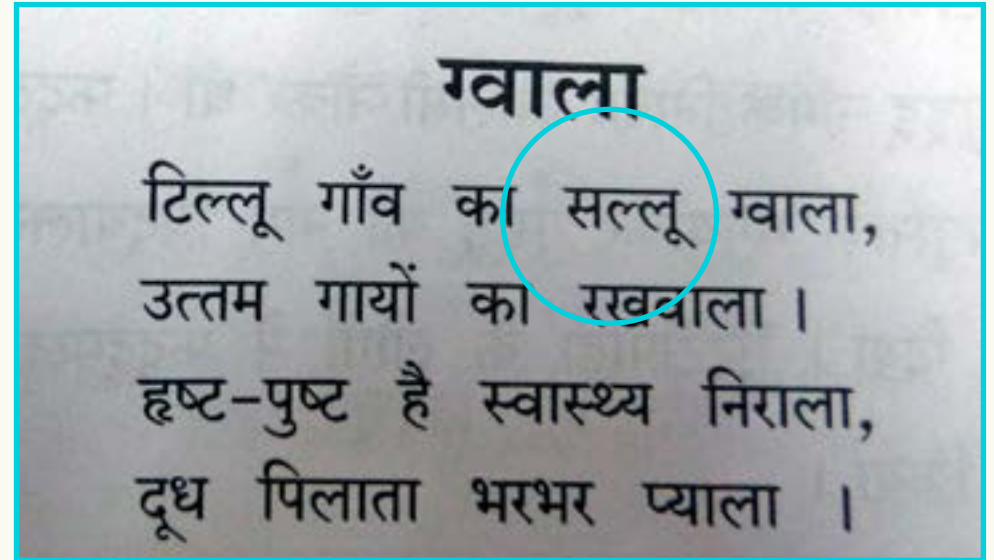
A child sees various things around her/his environment. In the school, many such things are drawn and pronounced and make association with words and picture. This is repeatedly done.

Words are written and copied several times to make child understand the word formation.



- **Method 1:**

Conjuncts are taught to children when they come across in a word while teaching a lesson.



- **Method 1:**

Conjuncts are taught to children when they come across in a word while a lesson is taught.

- **Method 2:**

They are told to pronounce it again & again and write it by copying them.

● पढ़ो : हल् लगाकर जुड़ें हम ।

ज्वार	कुत्ता	पुष्प
म्यान	गुब्बारा	चूल्हा
ग्यारह	खय्याम	पथ्य
त्र्यंबक	पश्चिम	शत्रुघ्न
अभ्यास	उन्नीस	अक्षुण्ण

अभ्यास २८ : हलन्त रू ञ् और अः रू
शब्दों को पढ़ो। खाली जगह भरो और शब्द पूरा करो।

		
कुर्सी	दर्जी	वर्षा
कु —	द —	व —

Rastrabhasha Rachana:

- **Method 1:**

Conjuncts are taught to children when they come across in a word while a lesson is taught.

- **Method 2:**

They are told to pronounce it again & again and write it by copying them.

- **Method 3:**

Similar sounding words are taught together for redundancy.



स्कूल विजिट्स इन मुंबई, पुणे

School Visits in Mumbai, Pune

'Currently, NO NEW METHOD for teaching Conjuncts'

90%

Conjunct teaching is done by writing
and pronouncing them repeatedly

स्कूल विजिट्स इन मुंबई, पुणे

School Visits in Mumbai, Pune

'Currently, NO NEW METHOD for teaching Conjuncts'

90%

Conjunct teaching is done by writing and pronouncing them repeatedly

70%

Wrong conjunct construction is important too to teach correct ones. They are taught only when they come across in a lesson.

स्कूल विजिट्स इन मुंबई, पुणे

School Visits in Mumbai, Pune

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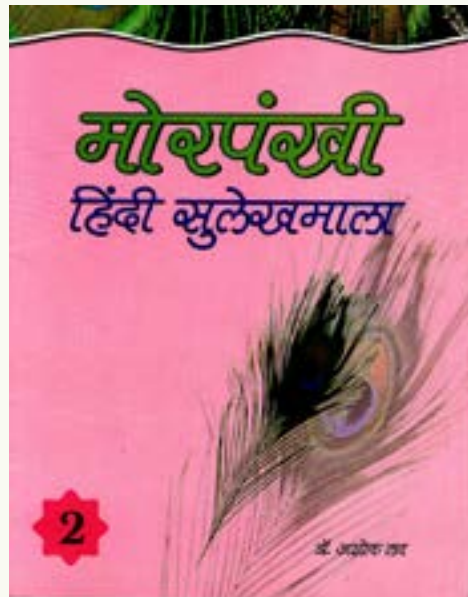
Wrong conjunct construction is important too to teach correct ones. They are taught only when they come across in a lesson.

40%

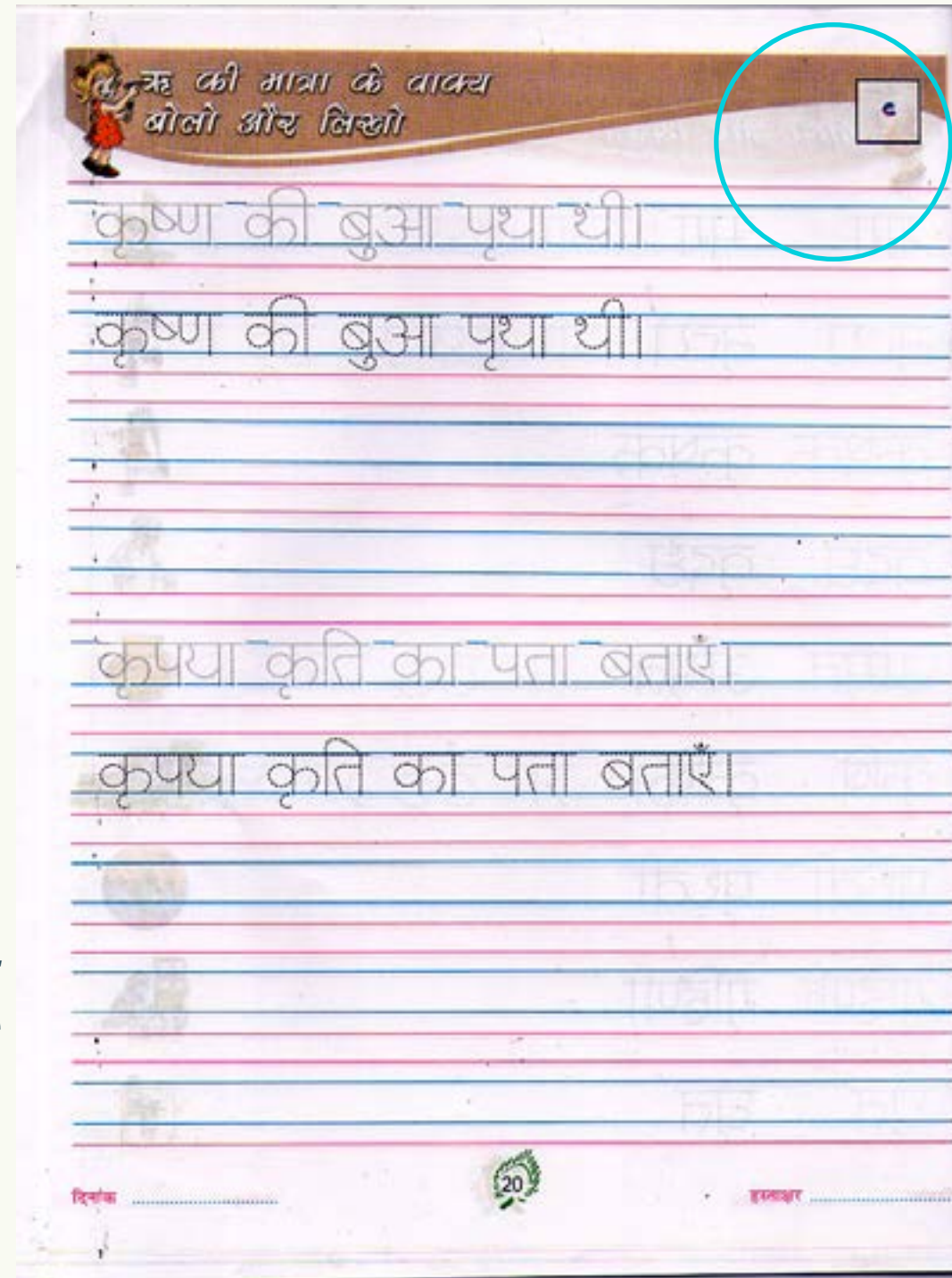
Similar sounding words are taught together & when a conjunct come across a word, then and then only it is taught.

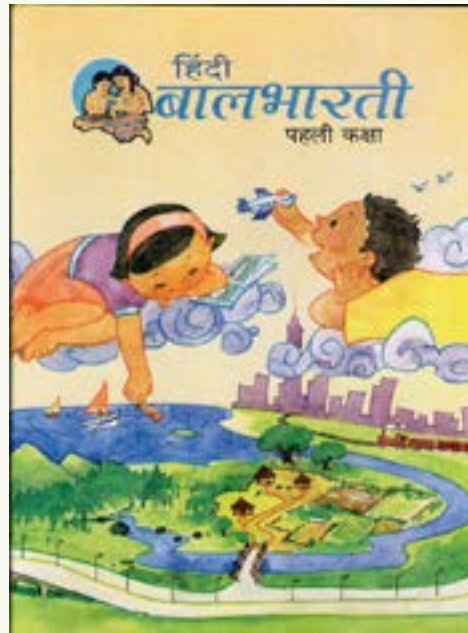
एक्सिस्टिंग बुक्स

Existing Books



Morapankhi Hindi Sulekhmala:
Writing conjunct containing sentence
repeatedly by overwriting and copying





Hindi Balbharati Std. 1:

By reading and discussing about the picture containing conjunct, guess and tell activity.

७. जुड़ें हम

● पहचानो और बताओ :



● सुनो और दोहराओ :

मुख्य लक्ष्य पर ध्यान लगाओ ।

प्यारे बच्चो स्वर में गाओ ।

● चित्र के बारे में चर्चा करो ।

● गढ़ो : हल लगाकर जुड़ें हम ।

ज्वार

कुत्ता

पुष्प

म्यान

गुब्बारा

चूल्हा

ग्यारह

खय्याम

पथ्य

त्र्यंबक

पश्चिम

शत्रुघ्न

अभ्यास

उन्नीस

अक्षुण्ण

● देखकर लिखो :

गवाला

टिल्लू गाँव का सल्लू गवाला,

उत्तम गायों का रखवाला ।

हृष्ट-पुष्ट है स्वास्थ्य निराला,

दूध पिलाता भरभर प्याला ।

□ इस गूँठ का अध्ययन करने से पहले गूँठ १५ पर दिए गए अध्ययन शीट पर पढ़कर विचारों से अभ्यास कराएँ ।



Bhasha Parichay - 2:

Different kind of conjuncts are shown and their use in a word

संयुक्ताक्षर (जुड़े हुए अक्षर)

शब्दों और पदों :



क् + क

क्क

मक्का

क् + ख

क्ख

मक्खड़ी



च् + छ

च्छ

मच्छर



ज् + व

ज्व

ज्वार



ट् + ट

ट्ट

लट्टू





Rastrabhasha Rachana:
Children have to look into conjuncts and write them by copying it.

अभ्यास २६ : पाई वाले हलन्त अक्षर ग = १, च = २, म = ३
पढ़ो। खाली जगह भरो और शब्द पूरा करो।



डुगी
डु —



बच्चा
ब —



कुत्ता
कु —



रस्सी
र —



अम्माँ
अ —



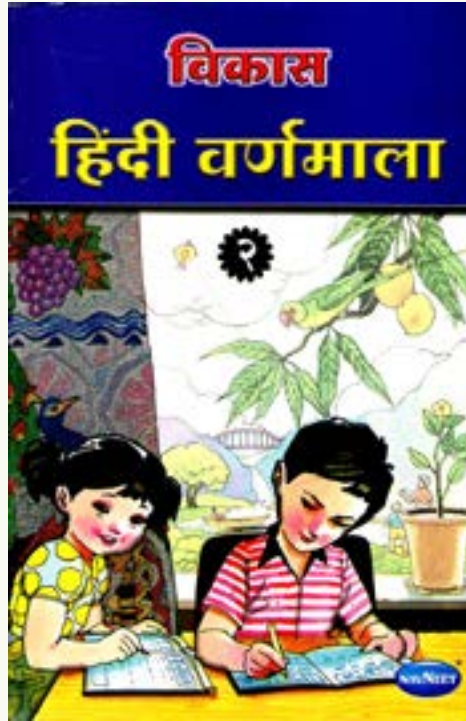
बिल्ली
बि —

शब्दों को लिखो :

चम्पा	डुगी	रस्सी	रस्ता	कुत्ता	बिल्ली
अम्माँ	बच्चा	कच्चा	पप्पू	कित्तूर	कश्मीर

देखो और लिखो :

ग	म	च	ख	ल	श	त	प	स
—	—	—	—	—	—	—	—	—



Vikas Hindi Varnamala - 2:

Look, learn and writing activities

संयुक्त अक्षर

सीखो और लिखो :

क् + क = क्क	क्क	.....	.....
क् + ख = क्ख	क्ख	.....	.....
क् + त = क्त	क्त	.....	.....
क् + य = क्य	क्य	.....	.....
क् + र = क्र	क्र	.....	.....
क् + ष = क्ष	क्ष	.....	.....
ख + त = ख्त	ख्त	.....	.....
ख + म = ख्म	ख्म	.....	.....
	जख्म	.....	.....
	मक्का	.....	चक्की
	मक्खन	.....	मक्खी
	शक्ति	.....	भक्ति
	क्यारी	.....	क्यों
	चक्र	.....	शुक्र
	कक्षा	.....	क्षमा
	तख्ती	.....	सख्ती

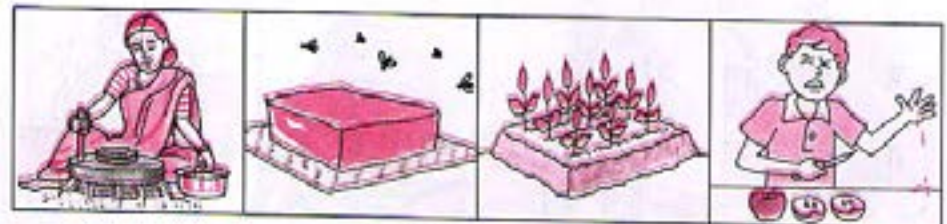
पढ़ो :

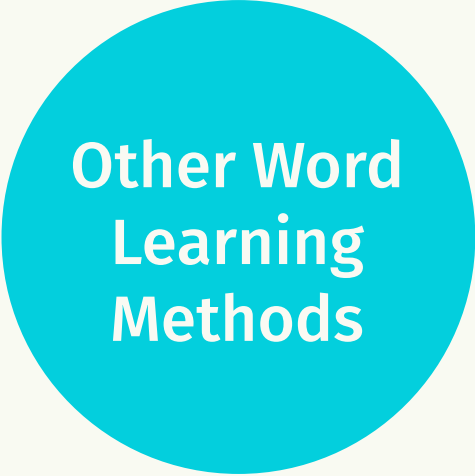
(१) माँ मक्का पीसती है।

(३) क्यारी में पौधे हैं।

(२) मक्खन पर मक्खी उड़ती है।

(४) कटने से रक्त निकलता है।

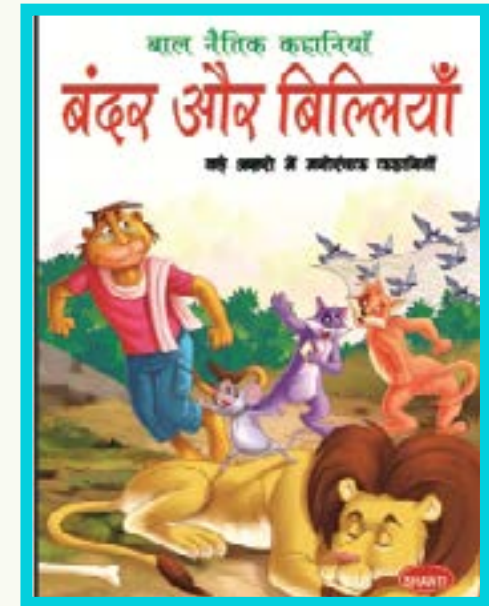




Other Word Learning Methods

Through telling stories,
looking at books and
discussions

Other Word Learning Methods



Through telling stories,
looking at books and
discussions

Other Word Learning Methods

- Word cards: By making word cards with word & picture - word picture relationship



www.quick-n-ez.com

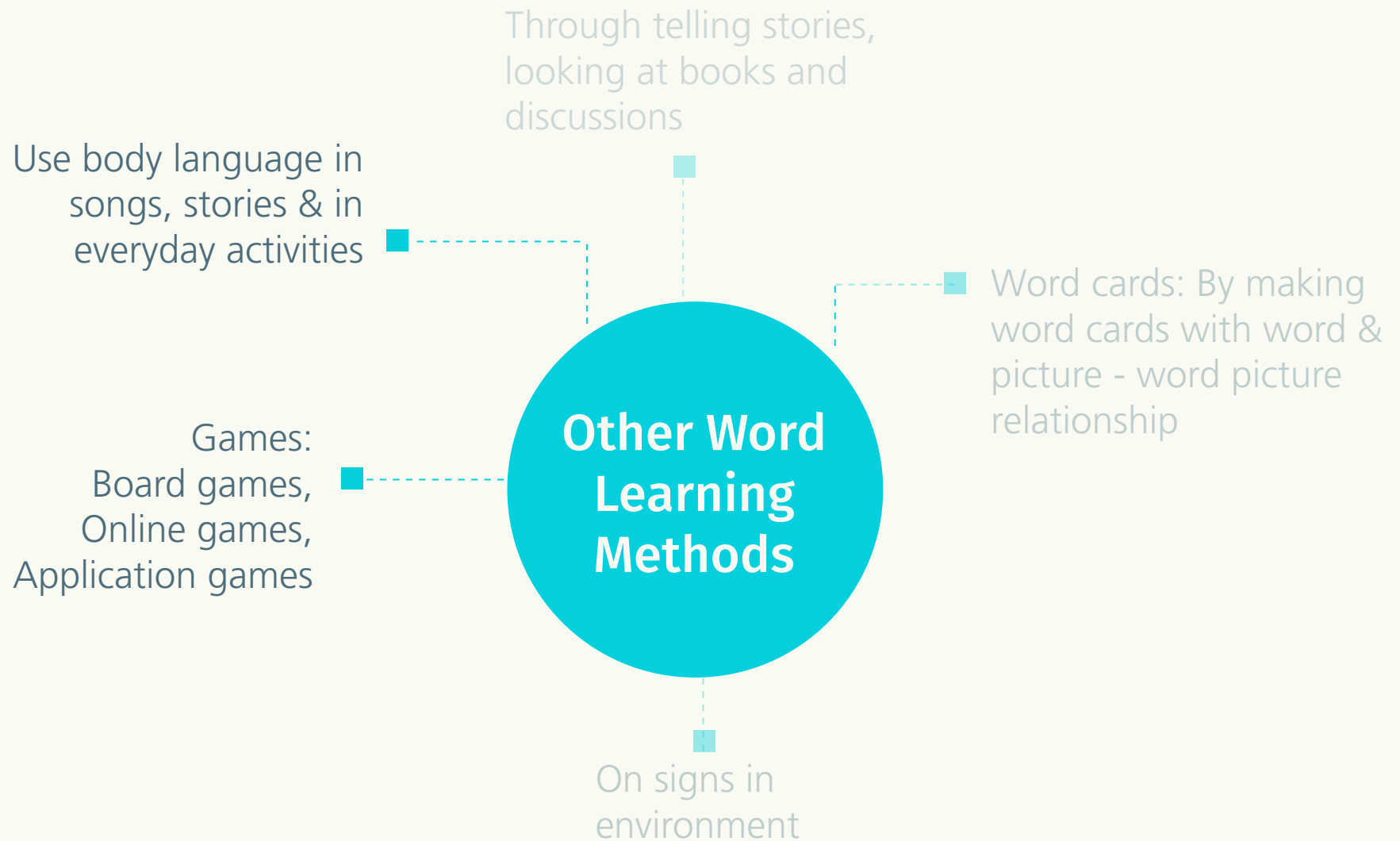
Through telling stories,
looking at books and
discussions

Word cards: By making
word cards with word &
picture - word picture
relationship

Other Word Learning Methods

On signs in
environment





एक्सिस्टिंग गेम्स

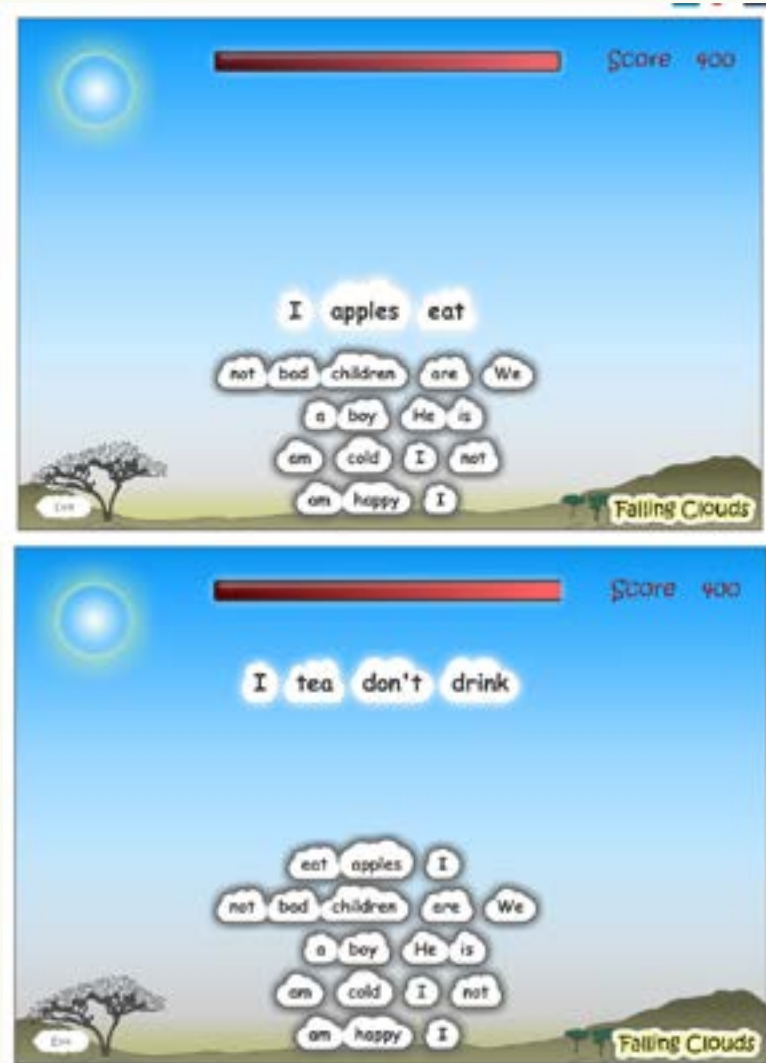
Existing Games

Falling Clouds:

The words fall down in the form of cloud, and there is a timer running. Player has to pick a word and arrange them grammatically correct to make a correct sentence.

If the arrangement is correct they will disappear, if they don't, there will be a pile of clouds.

As the pile increases and reaches the top, you loose the game.





इनिशियल कॉन्सेप्ट्स

Initial Concepts

1. By different category names like Fruits, Flowers, Animals, Birds, Vehicles, etc.
2. Similar sounding names,
3. Number of consonants in a conjunct word
4. In sequence of letters '*Varnamala*'
5. By constructing a story

इनिशियल कॉन्सेप्ट्स

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3. Number of consonants in a conjunct word
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- 5. By constructing a story**

Level: 1

Select one of the categories among these. At the end of the game, player will know a specific number of fruits, etc. The aim here is to make a complete basket of fruits.

1. Select the category from which the game has to be played.



2. Select the category for which the game has to be played. Here 'Fruits' is selected.



3. A picture will appear.
Child has to guess the picture
name say it aloud and start
playing further.

Banana = केला



4. Letter-form chart option will be visible and a blank box below the picture will be visible



5. Player has to pick any letter-form drag and drop inside the box. Sound of that letter will be heard.



6. If the answer is correct it
will sit inside the box



क

⁺अ

⁺ए

⁺ल

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7. In the same manner the word has to be completed in sequence. If the player chooses wrong letter, it will come back to the chart.



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केला

पेपर प्रोटोटाइप टेस्टिंग

Paper Prototype Testing

8 year old kid

- Sound played an important role. Every-time which playing, he pronounced each letter, and then piked the letter.
- Sometimes, picture name was know to him but sometimes for difficult words, word reference was given.



रस्सी



नीला
केला
गुलाब
रस्सी

- This conjunct was completely new
- Was difficult to pronounce
- Its formation was not know

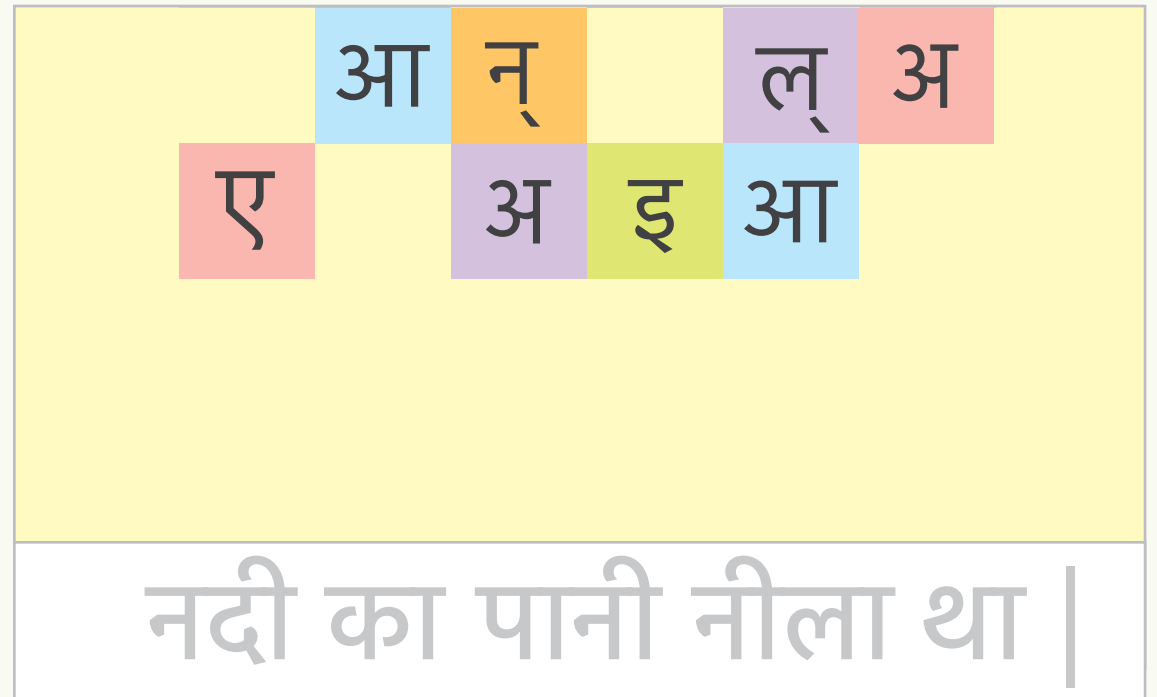
राष्ट्रभाषा

Level: 2

There will be a story which the game will be built. According to the story, some words will be blank or grey and player had to complete those words and complete the story.

STEP 1:

Letter-form will start falling in a specific duration from above. A word has to be constructed by choosing these letters.



STEP 2:

Start picking correct letters and drop in the box below.

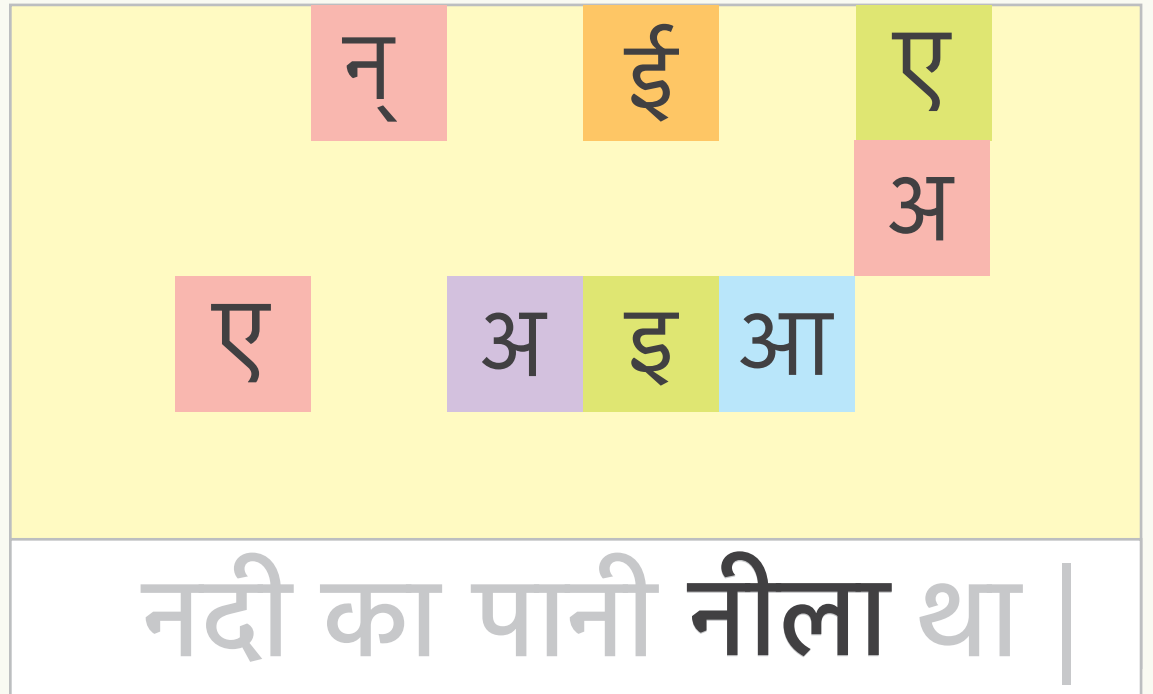
नदी का पानी नीला था |

The correct letter will get indicated below in the word.

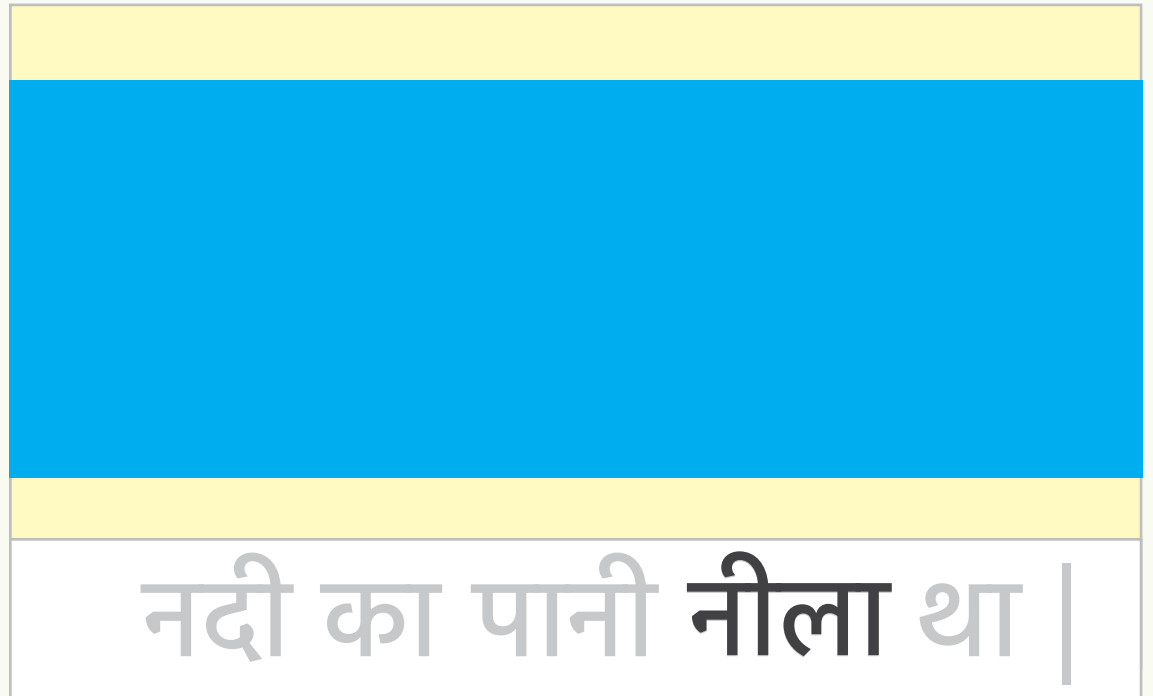
	ई	न्		ई		ए	
		आ	न्			अ	
	ए		अ	इ	आ		

नदी का पानी नील् था ।

In the same manner
the word will be formed.



Picture related to
that word will be shown.



Thus when the sentence is completed, the whole picture in the story gets revealed.



नदी का पानी नीला था ।

WORDS

STORY

WORDS ----- STORY

द प्रोसेस The Process



ट्रांसफॉर्मेशन ऑफ़ लेवल

Transformation of Level





BEFORE

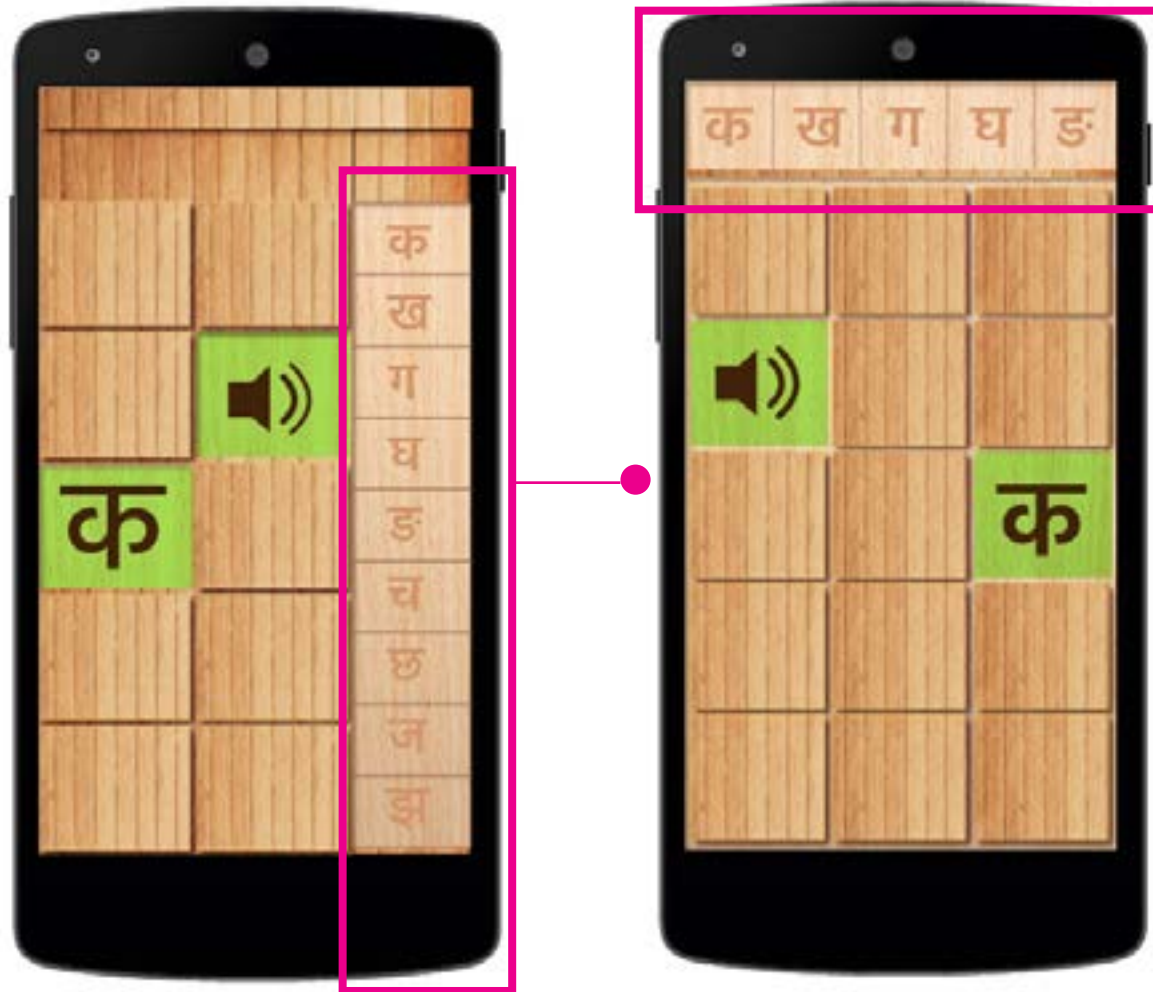
AFTER

ट्रांसफॉर्मेशन इन लेआउट

Transformation in Layout



BEFORE

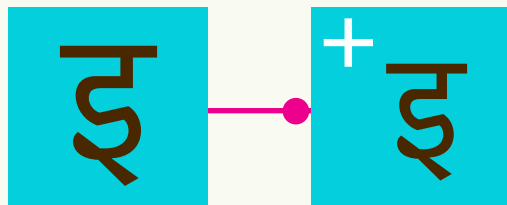


BEFORE

AFTER

फीचर्स ऑफ़ द गेम

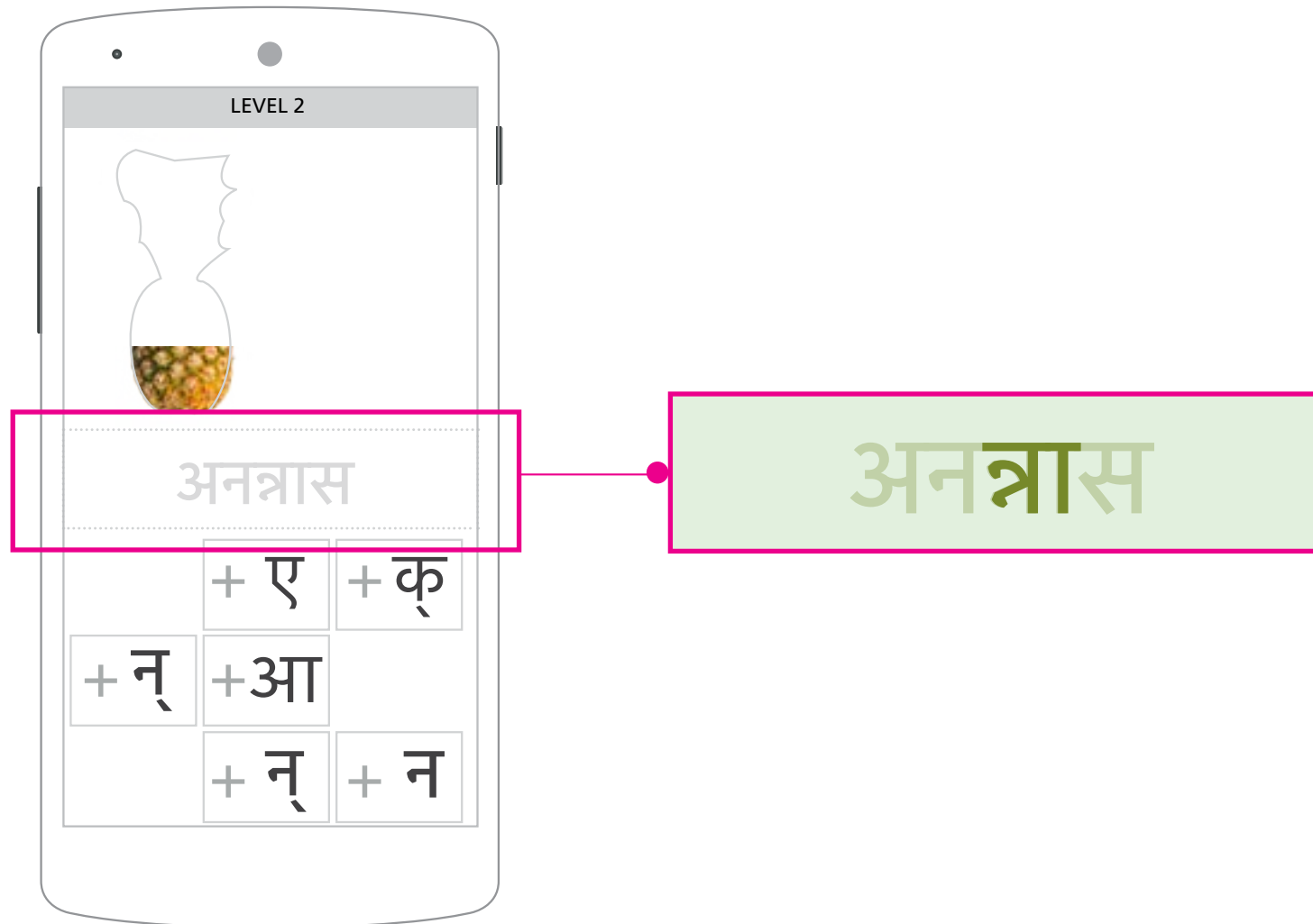
Features of the Game

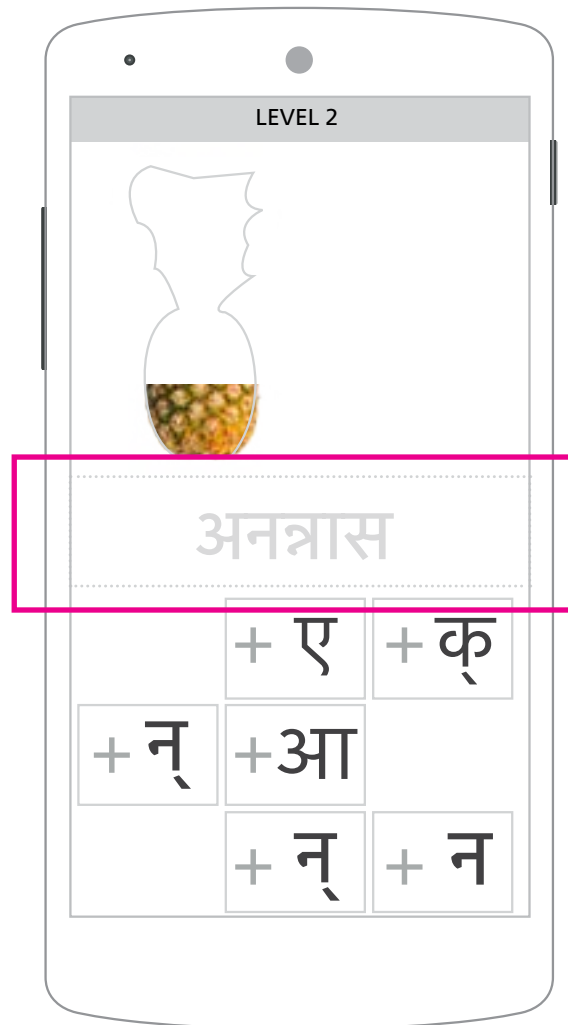


इ + इ + इ









अनन्नास

न् + न = न्न

Knowing Formation of
Conjunct was important





Conjunct Formation



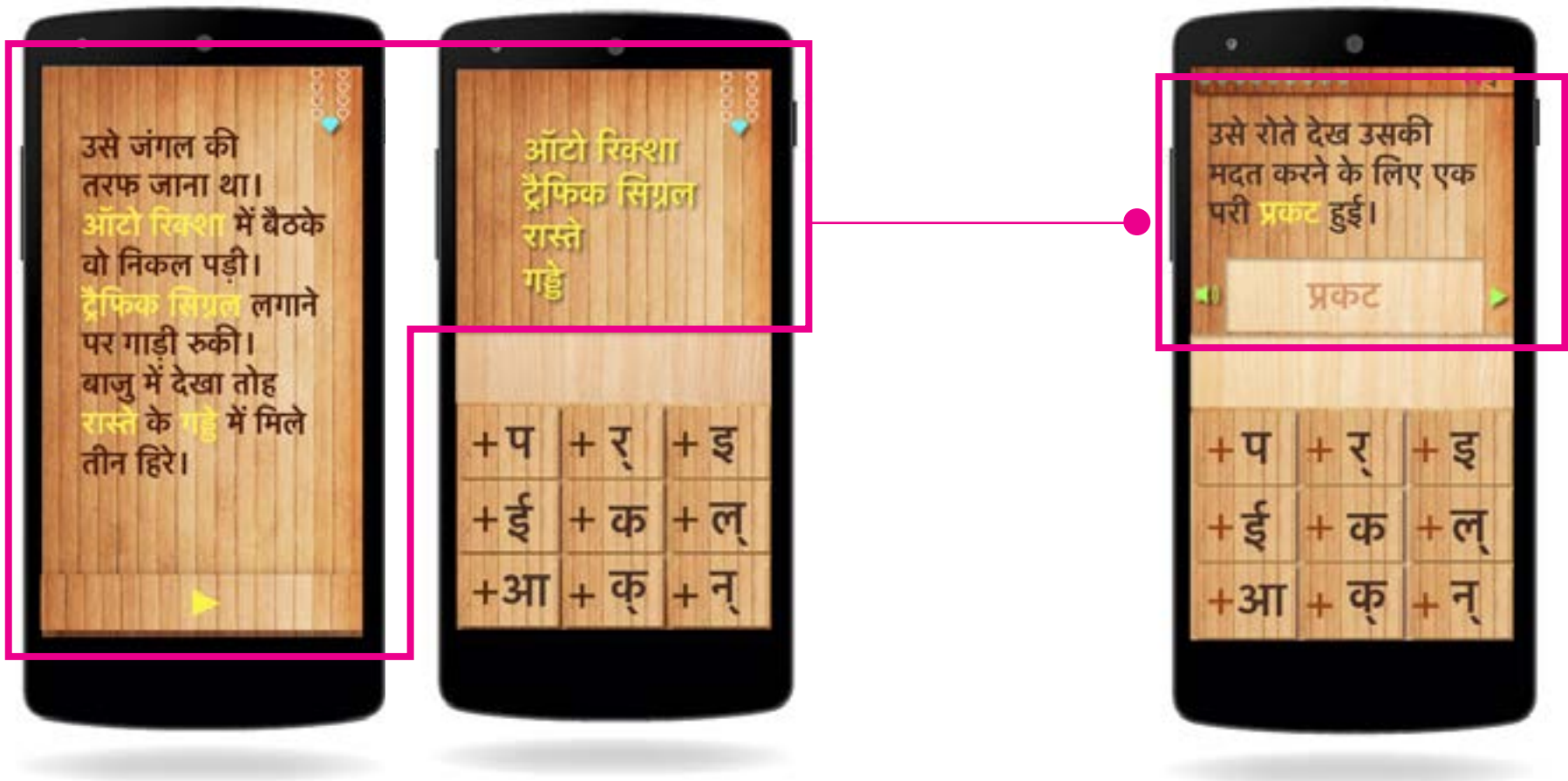
Conjunct Solved







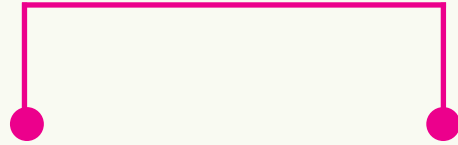




व्हाय स्टोरी?

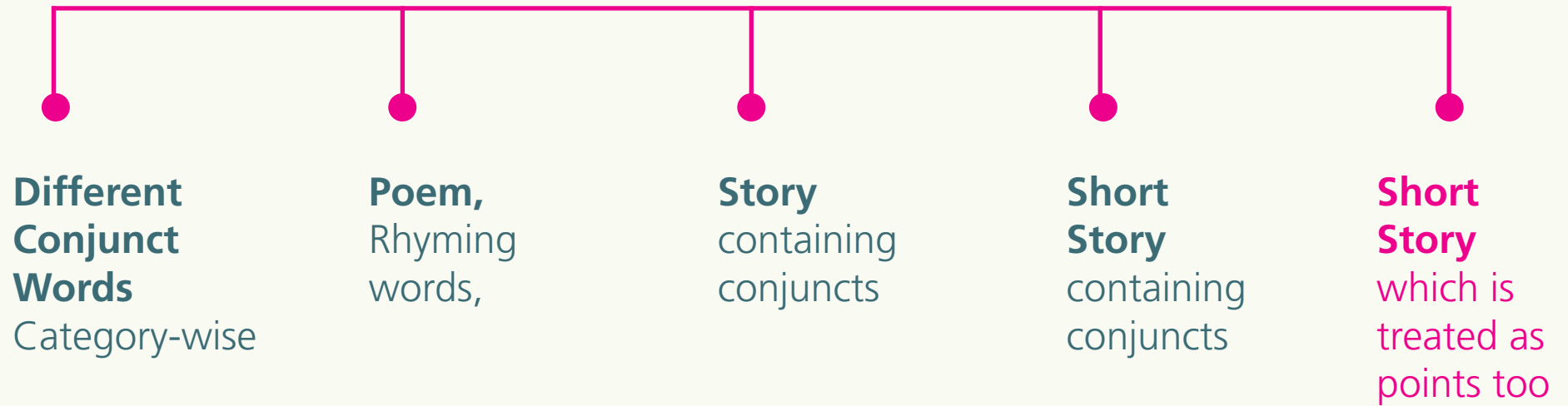
Why Story?

- It will create curiosity
- It will keep a child to grab attention
- It will have a start and for end,
player has to play and reach the end



**Different
Conjunct
Words**
Category-wise

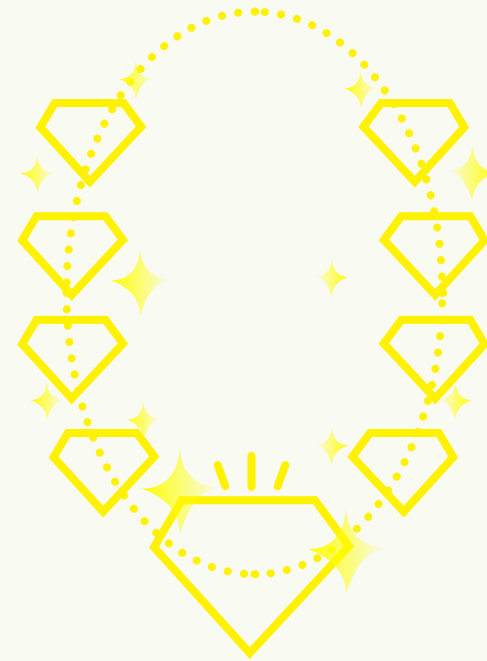
Poem,
Rhyming
words,



स्टोरी ऑफ़ द गेम

Story of the Game

- The story is narrated in such a way that it engages a child and makes a child curious about playing.
- The task was to complete a diamond necklace by bidding all diamonds in the necklace.

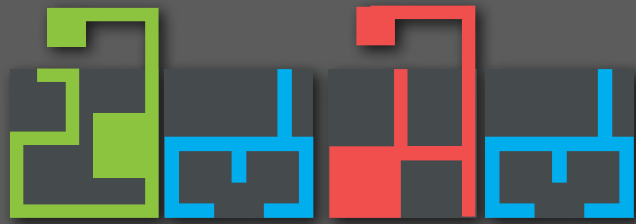


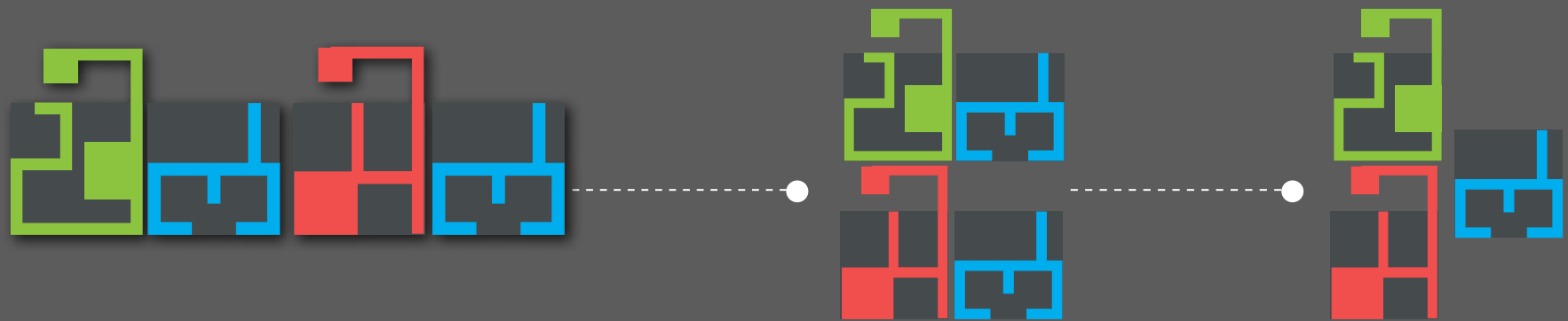
स्टोरी ऑफ़ द गेम

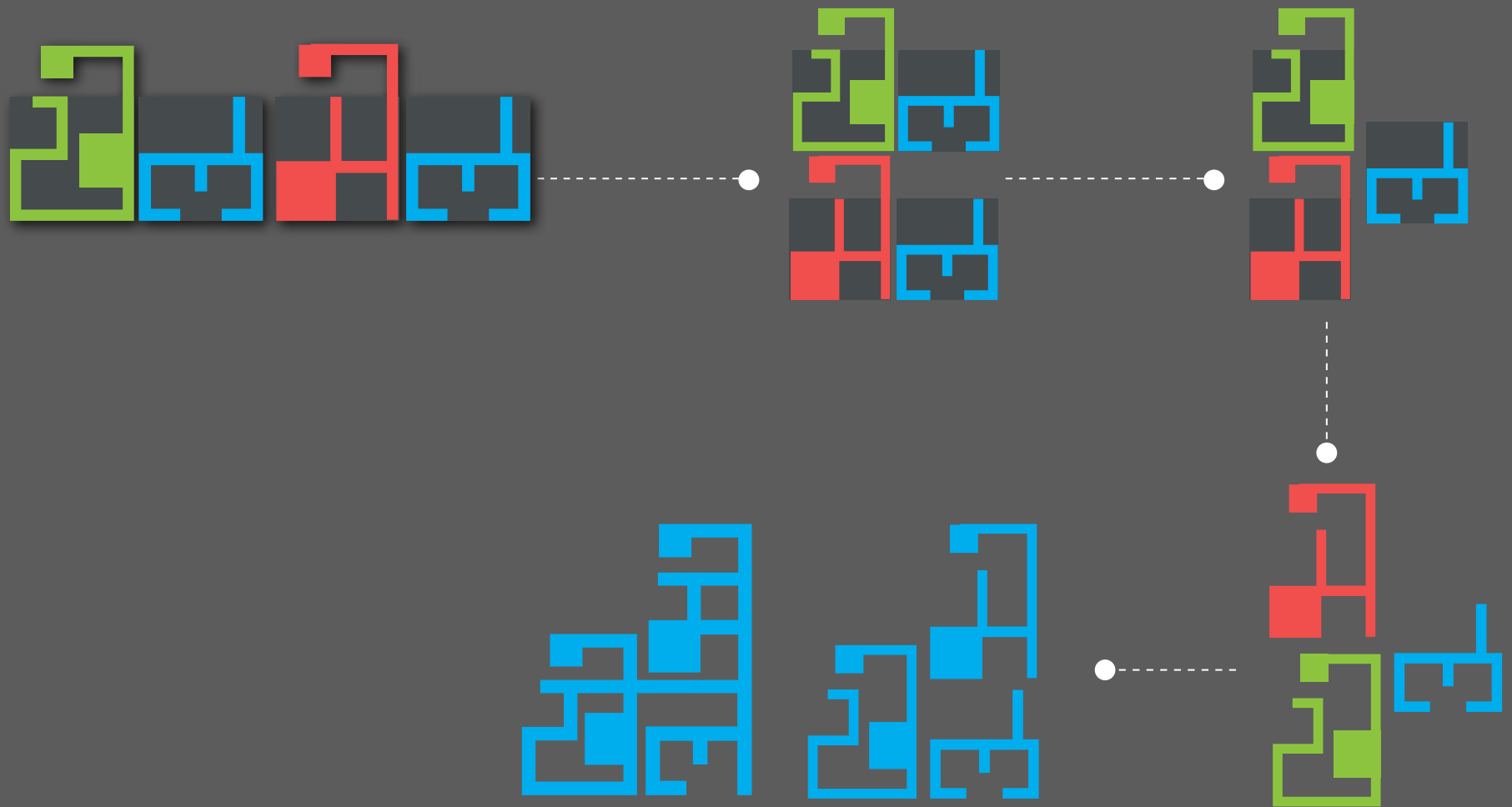
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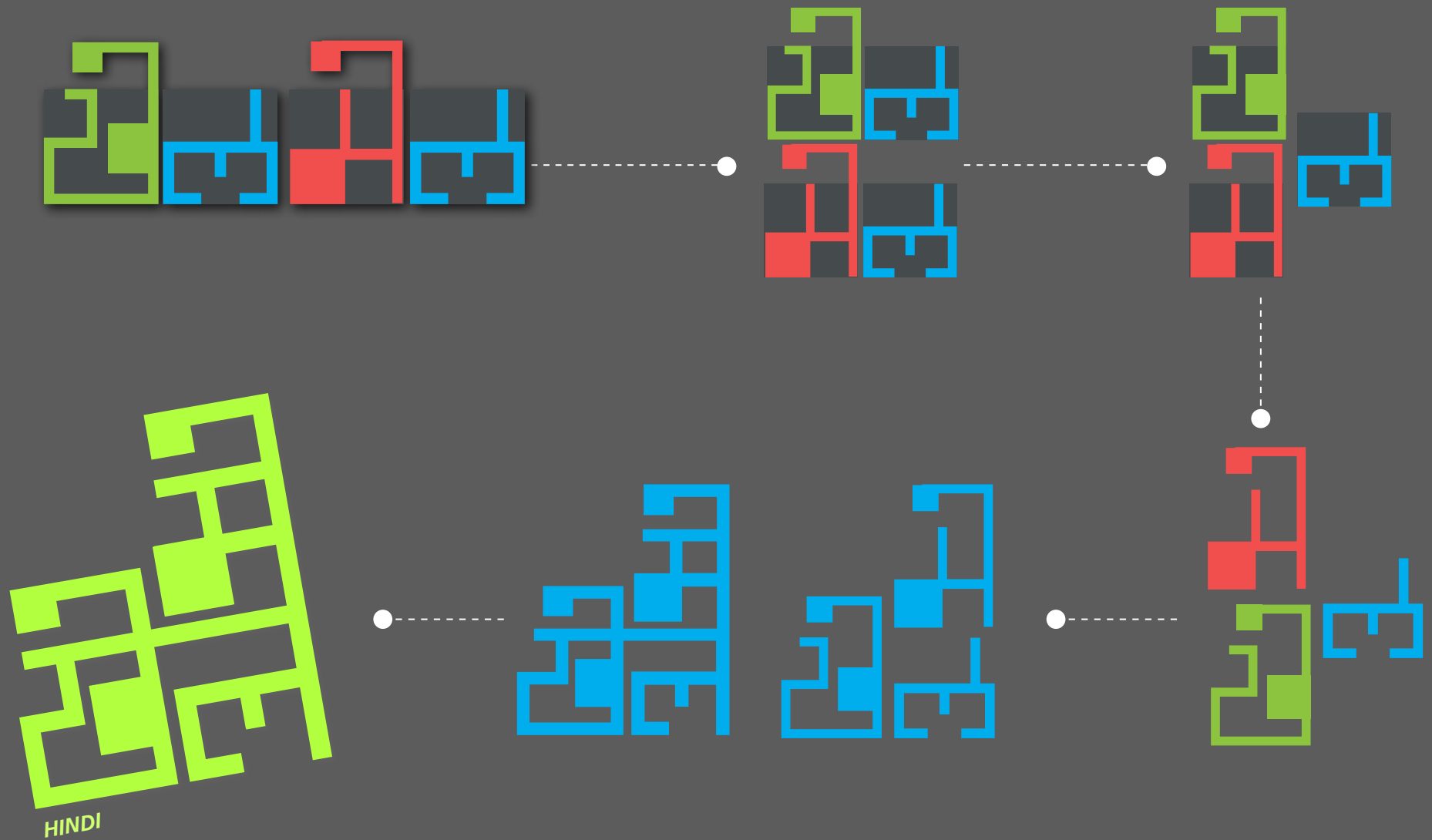
- The story is narrated in such a way that it engages a child and makes a child curious about playing.
- The task was to completed a diamond necklace by bidding all diamonds in the necklace.
- To collect each diamond, player has to complete the story. In that story, conjunct related word will be missing. As the player will play and solve conjuncts, gradually story will complete and the necklace will be completed by diamonds.
- When the story gets completed, game ends.











लर्निंग्स

Learnings

- To design an Game Application
- To design a game application which will be entertainment as well as educational too
- Visual design by which game can be better understood



फ्यूचर स्कोप

Future Scope

This game can be used to recognise and learn **any Indian language script**, by taking support of sound.

As there is repetition of sound & letter-form included in this game, a **partially hearing impaired person** too can play and learn a script similarly.



रेफरेन्सेस

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www.omniglot.com/
www-01.ibm.com/software/globalization/topics/indic/word

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Bhasaha Parichay - 2
Hindi balbharati - Std. 1
Hindi sikho, Haste-Khelate Chutaki-Bajate: Part 1
Morpankhi, Hindi Sulekhmala - 2
Rashtrabhasha Rachana
Devanagari Lipi: Chinhachi Shastri Olakh Aani Paribhasha,
---by Prof. Mukund Gokhale
Lihave Netake : 1 ---by Madhuri Purandare
Lihave Netake : 2 ---by Madhuri Purandare

Font families

Frutiger LT Std
Fira Sans OT
Kohinoor Devanagari

एकनॉलेजमेंट्स

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Parents, Vedavati, Harsha,
Shweta, Tanushree, Friends,
Adobe Master Collection Suite.

थैंक यू !

Thank You !

Please give your valuable feedback...

